

**CLAIMS**

1. An engine transition test instrument comprising:
  - virtual engine test means for simulating a transition state in which an engine
  - 5 rotational speed or torque changes with time,
  - wherein the virtual engine test means comprises
  - simulation means for simulating behavior of an engine by a transition engine model
  - created based on data obtained by driving an actual engine while changing a value of at
  - least one controlled factor;
  - 10 virtual control means that emulates actual control means that controls an actual
  - engine, and supplies an engine control signal to the simulation means; and
  - control value operation means that supplies a control value for the controlled factor
  - to the virtual control means, causes simulation results by the simulation means to be
  - displayed on display means of an operator, and corrects the control value according to an
  - 15 operation by the operator,
  - wherein the control value operation means comprises means for causing a control
  - value used for the simulation to be displayed in a time-series graph on the display means
  - along with the simulation results.
- 20 2. The engine transition test instrument according to claim 1, further comprising:
  - means for conducting a transition test on actual engine using a control value
  - corrected by the control value operation means; and
  - means for updating a transition engine model in the simulation means based on test
  - results by the means for conducting the transition test.
- 25 3. The engine transition test instrument according to claim 1, wherein the control
- value operation means updates a control value according to a drag operation by an operator
- with respect to the control value displayed as a graph on the displaying means.

4. The engine transition test instrument according to claim 1, wherein the control value operation means causes a target value for a simulation by the simulation means to be displayed on the display means in parallel with simulation results.
- 5 5. The engine transition test instrument according to claim 1, wherein with respect to a portion in which the difference between simulation results and a target value exceeds a permissible limit, the control value operation means causes the simulation results to be displayed in a display pattern different from that for the other portions.
- 10 6. The engine transition test instrument according to claim 1, wherein with respect to a control value that corresponds to a portion in which the difference between simulation results and a target value exceeds a permissible limit, the control value operation means causes the control value to be displayed in a display pattern different from that for the other portions.
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7. The engine transition test instrument according to claim 1, wherein the control value operation means divides the simulation time into time slits of a unit period of time, and causes a time slit in which an integrated value of the difference between simulation results and a target value exceeds a threshold value to be displayed in a display pattern
- 20 different from that for the other time slits.
8. An engine transition test method comprising:
- a first step of creating a transition engine model created based on data obtained by driving an actual engine while changing a value of at least one controlled factor in a
  - 25 transition state in which an engine rotational speed or torque changes with time,
  - a second step of assuming the transition engine model as a virtual engine, and displaying a control value for the controlled factor for operating the virtual engine;
  - a third step of emulating actual control means that controls an actual engine and supplying an engine control signal to the virtual engine based on the control value;

a fourth step of displaying simulation results of operating the virtual engine according to the engine control signal; and

a fifth step of correcting the control value according to the displayed simulation results,

5        wherein the second through the fifth steps are repeated until the simulation results satisfy a performance objective;

in the second step, the control value is displayed in a time-series graph; and

in the fourth step, the simulation results are displayed in parallel with the graph display of the control value.

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9.     The engine transition test method according to claim 8, further comprising:

a sixth step of providing a control value with which a performance objective has been satisfied by repeating the second through the fifth steps to control means of an actual engine, and conducting an actual transition test on the actual engine; and

15       a seventh step of updating the transition engine model based on results of the transition test,

wherein the second through the fifth steps are repeated with the updated transition engine model.

20    10.   The engine transition test method according to claim 8, wherein in the fifth step, with respect to the control value displayed in a graph in the second step, the control value is updated by an operator performing a dragging operation.

11.   The engine transition test method according to claim 8,

25       wherein in the second step or the fourth step, a target value for a simulation is displayed in parallel with simulation results in the fourth step.

12.   The engine transition test method according to claim 8, wherein in the fourth step, with respect to a portion in which the difference between simulation results and a target

value exceeds a permissible limit, the simulation results of that portion are displayed in a display pattern different from that for the other portions.

13. The engine transition test method according to claim 8, wherein in the fourth step, a control value corresponding to a portion in which the difference between simulation results and a target value exceeds a permissible limit is displayed in a display pattern different from that for the other portions.

14. The engine transition test method according to claim 8, wherein in the fourth step, the simulation time is divided into time slits of a unit period of time, and a time slit in which an integrated value of the difference between simulation results and a target value exceeds a threshold value is displayed in a display pattern different from that for the other time slits.

15. A computer program that realizes, by being installed on an information processing system:

simulation means for simulating behavior of an engine by a transition engine model created based on data obtained by driving an actual engine while changing a value of at least one controlled factor;

20 virtual control means that emulates actual control means that controls an actual engine, and supplies an engine control signal to the simulation means;

control value operation means that supplies a control value for the controlled factor to the virtual control means, causes simulation results by the simulation means to be displayed on a display screen of an operator, and corrects the control value according to an operation by the operator; and

means for causing a control value used for the simulation to be displayed in a time-series graph on the display means along with the simulation results.

16. A storage medium that is readable with an information processing system on which

the computer program according to claim 15 is stored.